IN THE CLAIMS

Please amend the claims as follows:

Claim 1 (Original): A method for optimizing machining conditions of an electric discharge machine that a work to be machined is subjected to electric discharge machining by use of a machining liquid, the method comprising:

a discharge voltage detecting step of detecting an average discharge voltage in a specified period of time at the time of electric discharge machining;

a discharge current computing step of determining a discharge current that makes a discharge voltage detected by the discharge voltage detecting step equal to a discharge voltage when an new machining liquid is used from the relationships between a discharge voltage when the new machining liquid is used, and volume resistivity and discharge current of the new machining liquid; and

an optimum machining condition computing step of determining discharging time, non-operating time, and a servo reference voltage, which depend on a discharge current determined by the discharge current computing step, from the relationships between a discharge current, discharging time, non-operating time, and a servo reference voltage that establish optimum machining conditions.

Claim 2 (Original): The method for optimizing machining conditions of an electric discharge machine according to claim 1, wherein the optimum machining condition computing step computes optimum machining conditions from the following relational equations:

$ON = A \times Ip - B$

$OFF = C \times EXP(D \times ON)$

$SV = E \times ON^{\wedge} - F$

where ON is discharging time, OFF is non-operating time, SV is a servo reference voltage, Ip is a discharge current, and A to F are coefficients and their ranges of application are A = 7 to 10, B = 1.0 to 3.5, C = 25 to 35, D = 0.01 to 0.02, E = 200 to 250, and F = 0.2 t 0.4; and ^ represents power.

Claim 3 (New): An electric discharge machine comprising:

an electrode for machining, for performing electric discharge machining to a workpiece to be machined that is held in a machining liquid;

a servo for controlling a gap between this electrode for machining and the workpiece to be machined, and for applying a discharge voltage to the electrode for machining;

a servo control unit for sending a servo reference voltage to this servo;

a discharge voltage detecting unit, connected between the electrode for machining and the workpiece to be machined, for detecting a discharge voltage at the time of electric discharge machining:

a machining condition database storing unit for storing a discharge voltage and a discharge current when a new machining liquid is used, a volume resistivity of the new machining liquid, and a relational equation with a discharge current, a discharge time, a non-operating time, and a servo reference voltage that establish an optimum machining condition; and

an optimum machining condition computing unit, connected to the discharge voltage detecting unit and the machining condition database storing unit, for computing a discharge current, a discharge time, a non-operating time and a servo reference voltage when a discharge voltage detected by the discharge voltage detecting unit at the time of electric discharge machining coincides with a discharge voltage in the case of using the new machining liquid by the relational equation, and for sending the discharge current, the discharge time, the non-operating time and the servo reference voltage to the servo control unit.

Claim 4 (New): The electric discharge machine according to claim 3, wherein the relational equations with the discharge current, discharge time, the non-operating time, and the servo reference voltage that establish an optimum machining condition are as follows:

$$ON = A \times Ip - B$$

$$OFF = C \times EXP(D \times ON)$$

$$SV = E \times ON\text{\^{}} - F$$

where ON is a discharge time, OFF is a non-operating time, SV is a servo reference voltage, Ip is a discharge current; and A to F are coefficients and their ranges of applications are A = 7 to 10, B = 1.0 to 3.5, C = 25 to 35, D = 0.01 to 0.02, E = 200 to 250, and F = 0.2 to 0.4; and a symbol ^ represents power.